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| FACULTY: | Department of Mechanical Engineering |
| FIELD OF STUDY: | Transport |
| ERASMUS COORDINATOR OF THE FACULTY: | Dr hab. inż. Agnieszka Kułakowska, Prof. PK |
| E-MAIL ADDRESS OF THE COORDINATOR: | agnieszka.kulakowska@tu.koszalin.pl |
| COURSE TITLE: | Material strength |
| LECTURER'S NAME: | Dr hab. inż. Agnieszka Kułakowska, Prof. PK |
| E-MAIL ADDRESS OF THE LECTURER: | agnieszka.kulakowska@tu.koszalin.pl |
| COURSE CODE (USOS): | 7 |
| ECTS POINTS FOR THE COURSE: | 4 ECTS |
| ACADEMIC YEAR: | 2024/2025 |
| SEMESTER:<br>(W – winter, S – summer) | W |
| HOURS IN SEMESTER: | 30+30 |
| LEVEL OF THE COURSE:<br>(1st cycle, 2nd cycle, 3rd cycle) | 1st cycle |
| TEACHING METHOD:<br>(lecture, laboratory, group tutorials, seminar, other-what type?) | Lecture, practice |
| LANGUAGE OF INSTRUCTION: | • English full time scheme for classes with 5 and more international Erasmus+ students enrolled/accepted;<br>• English 50% individually with the teacher + Polish 50% with Polish students or individual project work-scheme for classes with less than 5 international Erasmus+ students enrolled/ accepted; |
| ASSESSMENT METOD:<br>(written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?) | Written exam |
| COURSE CONTENT: | 1. Types of loads. 2. The concept of deformation - purely volumetric, purely form deformations. 3. Elements of the theory of elasticity, features of material elasticity, features of material strength. 4. Hooke's law for simple stretching. 5. Principle of de Saint-Venant, superposition. 6. Stretching and compression of straight bars. 7. Analysis of statically indeterminate bars. 8. Bending of straight beams. Bending moment, shear force and continuous load relationships between them 9. Analysis of a straight bar during bending - diagrams of bending moments, shear forces and normal forces. 10. Geometric characteristics of flat figures. Moments of inertia and deviation. 11. Steiner patterns. Principal directions and principal moments of inertia. 12. Stresses in a bending bar. Stresses in beams with the participation of shear forces - Żurawski formula. 13. Static analysis of frames. Neutral axis, stresses in oblique bending. 14. Pure shear, technological shear. Hooke's law with pure shear. 15. Torsion of circular-symmetric bars, stress and deformation of a torsion bar. 16. Torsion of bars with non-circular cross-section. 17. Analysis of the state of stress and deformation. 18. Outline of the strength hypotheses - the greatest shear stresses, the Huber hypothesis. Bending with stretching or compression. 19. Energy methods. Castiglian |

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| | and Menabrea theorem. 20. Buckling of straight bars. |
| ADDITIONAL INFORMATION: | |

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